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ABSTRACT

This paper concerns early social adaptational and family antecedents of teenage delinquent behavior in a population of black first graders who were reassessed 10 years after the initial study. Subjects were 705 teenagers who had participated in the 1966-67 Woodlawn study and whose mothers had given permission for reassessment. At the time of the reassessment, the community of Woodlawn had the highest rates of official juvenile delinquency, as measured by juvenile court data, of the 76 Chicago neighborhoods. Issues of particular interest for this reassessment study were (1) whether first grade ratings of learning problems and/or aggressiveness were related to later delinquency, and (2) whether first grade social adaptational status (SAS) was related to later delinquency in the same way for males and females. Results showing relationships of first grade teacher ratings of shyness, aggressiveness, learning problems and relationships of family structure, aspects of family atmosphere (i.e., mother's expectations for her child's academic attainment and the mother's own psychological well-being), and family economic resources to teenage delinquency are reported. The information on delinquency in this study came from subjects' responses to items in "What's Happening?" -- a questionnaire that is a modified version of a validated delinquency scale developed by Gold (1970). A Rasch analysis of the items was performed separately for males and females to provide dependent and predictor variables. Then, log-linear models were used to analyze the data. Results are summarized and discussed. (Author/RH)

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SCHOOL AND FAMILY ORIGINS OF DELINQUENCY:

COMPARISONS BY SEX

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Many longitudinal studies have found that antisocial behavior in childhood, broadly defined, is related to adolescent and adult antisocial behavior. Many of these studies have included only males, possibly because the rate of antisocial behavior is much higher among males, because males seem to have more continuity in aggressiveness from one time to the next, or because our society, including its scientists, associates antisocial behavior with males as if it is a male problem. We argue, as does Harris (1977), that the failure to include the antisocial behavior of both males and females is a major shortcoming of research thus far into delinquency and criminality. Indeed the differences in rates offer a major opportunity to investigate the conditions leading to delinquency, whether these be biological, social, psychological, or some combination.

This paper concerns early social adaptational and family antecedents of teenage delinquent behavior in a population of first graders whom we reassessed ten years later, when they were teenagers. These children comprise the total population of first graders in an urban, black ghetto community on the South Side of Chicago. We explore the paths, whether different or similar, leading to delinquency for males and females in order to develop more complete explanations of delinquency. Our investigations will include aspects of their families, their social adaptation to school, and their psychological well-being.

Over the past seventeen years the Woodlawn studies have been based on a two-dimensional conception of mental health, psychological well-being and social adaptational status (see Kellam et al. 1975). Social adaptational status measures how a significant other--a natural rater--in a particular social field rates the individual's performance on the social tasks that the natural rater defines. Examples of natural raters in social fields are the parent in the child's home, the student's teacher in the classroom, other teenagers in the peer group, and the foreman on the job.

The concept of social adaptation is embedded in a life-span developmental perspective. Each stage of life finds individuals in one, two, or a few main social fields, which increase and decrease in importance as life proceeds. The school, peer group, and the family are those social fields that are most important for teenagers in our society.

The concepts of social adaptational status and natural rater do not imply that the natural rater's observations are objective or correct. We maintain that the natural rater's judgments have a certain face validity because they have important ramifications--the teacher gives grades and passes or fails students; foremen or supervisors assess job performance, etc. (see Kellam et al. 1975; Kellam and Ensminger 1980). Chance, the fit of the individual in a specific group, the idiosyncracy of the natural rater, and the individual's own behavior may all influence social adaptational status.

SAS and Deliquency

Social adaptational status (SAS) has particular relevance to delinquency. SAS is a measure of the success or failure of the performance of an individual in a social field. In our framework teenage delinquency is a form of social adaptation, or maladaptation, defined by the often conflicting standards of several social fields, mainly the peer group, the school, the family, and the legal system. We examine the relationship of adaptation in the first grade classroom to later delinquency as part of our overall interest in the effect of early SAS on later SAS.

One of the basic hypotheses about the origins of delinquency links it to school failure. Short and Strodtbeck (1965) draw such implications from their study of peer process and delinquent behavior:

> [T]he old message that delinquency begins in the home is more disavowed than reaffirmed by our analysis. Insofar that it is present, it emerges in a new form. We firmly believe that need dispositions which are requited by gang membership arise in the interaction between lack of preparation for school-type achievement in the home and the absence of access to alternative adaptation to failures in the school. (p. 275).

Glaser (1976) also emphasizes the importance of school, in suggesting that the relationship between school maladjustment and subsequent delinquency is becoming more marked because of the increasing educational credentials required for most types of employment. Gold (1978) concludes that the school may have a greater capacity to prevent and reduce delinquency than other major institutions

such as the family, peer groups, the juvenile justice system, and the media.

Our data thus far show that first-grade SAS ratings are important antecedents of later drug, alcohol, and cigarette use by males, but that only certain kinds of maladaptive males had an increased risk (Kellam et al. 1981). Males rated as aggressive (e.g. fights, breaks rules) or as both shy and aggressive by their first grade teachers had a greater risk of later substance use, while males rated as only shy (e.g. sits alone, doesn't speak up) were the least likely to report substance use. Adapting males and non-shy, non-aggressive males with learning problems were in the middle.

While these antecedents held only for males, another set of early measures predicted use of drugs and alcohol for both males and females. These were the readiness-for-school and IQ test scores. Brighter performing students, male and female, used drugs and alcohol more frequently. These findings suggest that only certain kinds of early failure may increase risk of later delinquent behavior, and the sources may be different in some ways and similar in others for females and males.

The studies of Robins (1966) indicate that children who showed antisocial behavior early in elementary school were more likely to have contact as adults with the criminal justice system than either those who had no problems or those whose problems were other than antisocial ones. Other

longitudinal studies have also found that early aggressiveness, variously defined and measured, relates to later delinquency (Conger and Miller 1966; Mitchell and Rosa 1981; Lefkowitz, Erons, Walder and Huesmann 1977; Farrington 1978;). Only, the Lefkowitz et al. study included females as well as males. They found that third-grade peer-rated aggression related to peer-rated aggression one year after the normal time of high school graduation for both males and females. However, early aggression related to later self-reports of antisocial behavior only for the males.

Given our past results for substance use and the delinquency literature cited above we are particularly interested in whether first grade ratings of learning problems and/or aggressiveness relate to later delinquency and whether first grade SAS relates to later delinquency in the same way for males and females.

Family and Delinquency

The importance of the family in delinquency theory and research has varied over the years. Since the 1950's there has been renewed interest in the impact of family structure. The effect of the actual family relationships and child-rearing atmosphere on delinquency has received increasing attention. The family's economic resources may also affect the child's delinquency. In this paper we examine the impact of family structure, some aspects of family atmosphere, and family economic resources on teenage delinquency. We focus on a central aspect of family

structure -- the variation in combinations of adults in the child-rearing families.

A very entrenched belief within the delinquency field is that children from "broken" homes are more likely to be delinquent than children from "intact" homes. However, the evidence that children from "broken" homes show greater delinquency is equivocal. Studies using official reports of delinquency often show children from nonintact homes to be referred more often to the juvenile justice system (Weeks & Smith 1939; West and Farrington 1973; Thomas and Cage 1977; Chilton and Markle 1972), but this may be explained by the tendency of juvenile justice personnel to consider that a youth from a one-parent family is in need of greater control; thus such youths are more likely to be referred to the police or courts. Other researchers have reported no such differences in self-reported delinquency (Nye 1958; Dentler & Monroe 1961; Hirschi 1969; Hennessy, Richards, & Berk 1978). Both Hirschi (1969) and Gold (1970) found the greatest delinquency in families with stepfathers.

Previous findings in the Woodlawn studies suggest that a greater specification of kinds of combinations of adults might well enlighten research on family structure and delinquency (Kellam, Ensminger, & Turner 1977). We examined family types at the time of first grade in two separate cohorts -- one of which comprises the study population in this paper -- by classifying the various combinations of adults at home on the basis of their

relationship to the study child. For example, mother alone households were those in which mother was the only adult; mother/father or mother/grandmother occurred with or without others. There were 86 different combinations of adults in the 1966-67 cohort and 79 in the 1964-65 cohort. These findings illustrate the great diversity in the households of the first-grade children in this community, and probably in others.

We found family type to be strongly related to the child's social adaptational status (SAS) in school, i.e., how adequate the child was judged by the teacher in performing classroom tasks. The results showed that the classification of families as "broken vs. intact" or "father present vs. father absent" was too simplistic. For both cohorts of first-graders mother alone families entailed the highest risk to SAS, but the presence of certain second adults was more effective than that of others. Mother/father families and mother/grandmother families were more effective than mother/stepfather families. In terms of risk in first to third grades the absence of the father was less important than the aloneness of the mother.

Since our data is prospective and longitudinal, we can examine whether the impact of family composition on delinquency varies according to the length of time the child has lived in a particular family type. We will examine not only whether different family types in first grade and ten years later have different risks of delinquency, but also whether the change or stability of the family type matters.

We include in this paper two aspects of family atmosphere, mothers' expectations for how far her child will go in school and the mothers' own psychological well-being. Both of these were measured in first grade and at the ten year follow-up. In our previous work, daughters whose mothers had low expectations for the daughters' future education at the time of first grade used more cigarettes later on and reported more psychiatric symptoms as teenagers. No such impact was found for the sons. Low expectations by the mother, especially in first grade, may indicate lack of positive reinforcement by the mother and may influence the child's motivation to achieve and inclination toward rebelliousness and delinquency.

Weissman and Siegel (1972) have suggested that mothers with poor psychological well-being may suffer impairment in their child-rearing behavior, particularly in the areas of stimulation and affection, and thus have children who engage in greater delinquency than children of mothers with greater psychological well-being.

The Woodlawn Community Epidemiological Project

The Woodlawn data were gathered prospectively on the total population of first-grade children in this poor, black, Chicago community in consecutive cohorts in the 1960s. We focus here on the 1966-1967 first-grade children. They were assessed three times in first grade and again in third grade regarding their psychological well-being and their social adaptational status (SAS), and they were

followed up 10 years later at age 16 or 17. Data were also gathered from the families of this cohort when the children were in first grade and again at the time of the 10-year follow-up.

In 1975-1976, we reinterviewed 939 (75%) of the mothers or mother surrogates out of the 1242 families from the 1966-1967 total first grade population. The mothers' refusal rate was 5.9 percent, and an additional 18.5 percent of mothers were not reinterviewed because we could not find them, because the families had moved from Chicago, or because their children from the study population were deceased. After the mother was interviewed and had given permission, the teenager was approached. Of the 939 teenagers of the reinterviewed mothers, 75 percent (n=705) participated in the reassessments, 14.5 percent refused to participate, and 10.4 percent had moved out of Chicago or were unavailable because they were in an institution or had unknown addresses. The study population for this paper consists of the 705 teenagers whom we reassessed. (For further information regarding the methods of tracking and follow-up and their possible influences on the sample, see Agrawal, Kellam, Klein, and Turner, 1978.)

In order to assess possible bias resulting from sample attrition, we compared the mothers whom we reinterviewed with those we did not, using the early information we had on both. The mothers whom we could not reinterview were more likely to have started child rearing in adolescence, had

been more mobile before and during the child's first-grade year, and had children who were more likely to have been in parochial schools in first grade. The mothers were not distinctive in their 1966-1967 psychological well-being, early family income, welfare status, or the number or types of adults at home. We found little or no difference in the social adaptational status or psychological well-being between children reinterviewed and those not reinterviewed (Kellam, Ensminger and Simon 1980).

Teenage Self-Reports of Delinquency

Based on previous research in the area of crime and delinquency, we have chosen self-reports of antisocial behavior to be the delinquency measure. We believe it represents the behavior of the individual better than reports of official contact (Hardt and Peterson-Hardt, 1977). Official contact measures reflect not only the individual's behavior but also the decisions and policies of police and court personnel.

The information on delinquency in this paper comes from responses to items in What's Happening?, a questionnaire administered to the teenagers who participated in the follow-up sessions. This instrument is a modified version of a delinquency scale developed by Gold (1970) and used by Johnston (1973) and Lefkowitz et al. (1977). Gold validated responses to these items by corroborating teenage self-reports with those ascribed to an individual by his/her peers. He found that the two assessments were in agreement

for the large majority of respondents. Little evidence for difference in truthfulness was found for either race or socioeconomic class.

Woodlawn had the highest rates of official juvenile delinquency as measured by juvenile court data of the 76 Chicago neighborhoods in 1975, the time of the collection of the self-report data. The mean self-reports of antisocial behavior are higher than those in any other study of delinquency that we have found (Lefkowitz et al., 1977; Gold, 1970). Both the self-reports of antisocial behavior and official court records show this population to be one with high rates of delinquency.

The original data on delinquency consisted of answers given by the teenage respondents to 23 items asking how frequently they had performed certain acts in the last three years. Table 1 lists the original 23 items. There were five possible responses to each question, ranging from "never" to "five or more times." We undertook extensive psychometric analyses of the items in order to examine three major questions: whether the latent structure was uni-or multi-dimensional, whether some items did not fit, and whether the latent structure was the same for males and females.

Table 1 goes about here.

Initial factor analysis seemed to indicate a number of separate factors, but these factors lacked stability in randomly selected subsamples. In order to explore the hypothesis that some or all of the 23 items formed a single ordered continuum, we performed a Rasch analysis of the items. Rasch modelling is a method for examining a set of items answered by a group of persons in order to calibrate the "abilities" of the persons and the "difficulties" of the items on an interval scale. It provides statistics for assessing the goodness of fit of items and persons to the unidimensional scale. (See Wright 1977.) We performed the analysis separately for males and females and tested the difference in the latent structure between the sexes.

The Rasch analysis showed that all but two of the items (those starred in Table 1) fit an underlying continuum reasonably well. In our sample the difficulties of the items diverged only at the very upper end of the scale for males and females, but, given the small number of respondents at the upper end, the differences were not statistically significant. We therefore assigned each respondent an overall delinquency score based on the Rasch analysis of the 21 remaining items for males and females together. This score is along an interval scale with a standard deviation of 0.855 and is the dependent variable analyzed in this paper.[1]

The dependent variable - the Rasch delinquency score described above - is an interval variable, and the

Table 1

Items Used for Self-Reports of Delinquency in the Last Three Years, in Order of Degree of Delinquency as Determined by Rasch Analysis

	Males (N=334)	Females (N=361)
Stayed out later than parents said	87.7%	80.2%
Drunk beer or liquor without parents' permission	64.8	51.2
* Smoked in school	45.0	46.0
Skipped a day of school without a real excuse	65.6	55.3
Had to bring parents to school because of something you did	74.8	57.8
Taken something from a store without paying for it	63.5	45.6
Suspended from school	64.1	46.1
Carried a weapon	55.2	26.3
Taken something not belonging to you	58.9	41.1
* Argued or had a fight with either of your parents	35.1	41.6
Got into a serious fight with a student at school	51.8	31.7
Been in trouble with police	48.5	.6
Participated in a gang fight	41.5	18.6
Went into someone's land or into someone's house when you weren't supposed to be there	39.7	17.2
Got something by threatening a person	35.3	14.2
Hurt someone badly enough to need bandages or a doctor	39.8	16.3
Damaged school property on purpose	32.2	12.6
Hit a teacher	29.4	18.9
Run away from home	14.1	12.1
Hit your mother	8.8	8.1
Hit your father	9.0	8.0
Taken a car without permission of the owner	16.1	1.3
Taken part of a car without permission of the owner	17.1	1.6

*These items did not fit the unidimensional continuum and were omitted from the analysis.

predictors are categorical variables. The standard statistical model for analyzing the effect of categorical variables on an interval variable is analysis of variance. Analysis of variance, however, assumes that the relationship of the predictors to the dependent variable is linear and constant throughout the scale on which the latter is measured. We have no theoretical reason to assume that this is the case. Hence we decided to group the scores into three categories and analyze the data using log-linear models for contingency tables. (See Habermann 1979; Bishop, Fienberg, and Holland 1975; Goodman 1972.) For reasons explained below we used separate categories for males and females. Within each sex the middle category included all scores within half a standard deviation from the mean, while the lower and upper categories included the more extreme scores.

Despite our exclusive use of categorical methods for statistical inference, we do take advantage of the interval properties of the data for descriptive purposes. We often interpret the statistical results of the categorical models in terms of the location and shape of the distribution of the Rasch delinquency scores. These methods provide more information than categorical data alone and also allow us to assess the males and females on the same scale.

Results

Sex Differences

As we should expect we found large differences in our data in the level of delinquency between the sexes. About

75 percent of the males were above the median for the females. Figure 1 shows the distributions of the two sexes. Our previous research on first grade predictors of other teenage outcomes indicated that males and females differed in the predictors that were most powerful (Kellam, Ensminger, and Simon 1980). In order to bring out these differences clearly, we analyzed the males and females separately.

Figure 1 goes about here

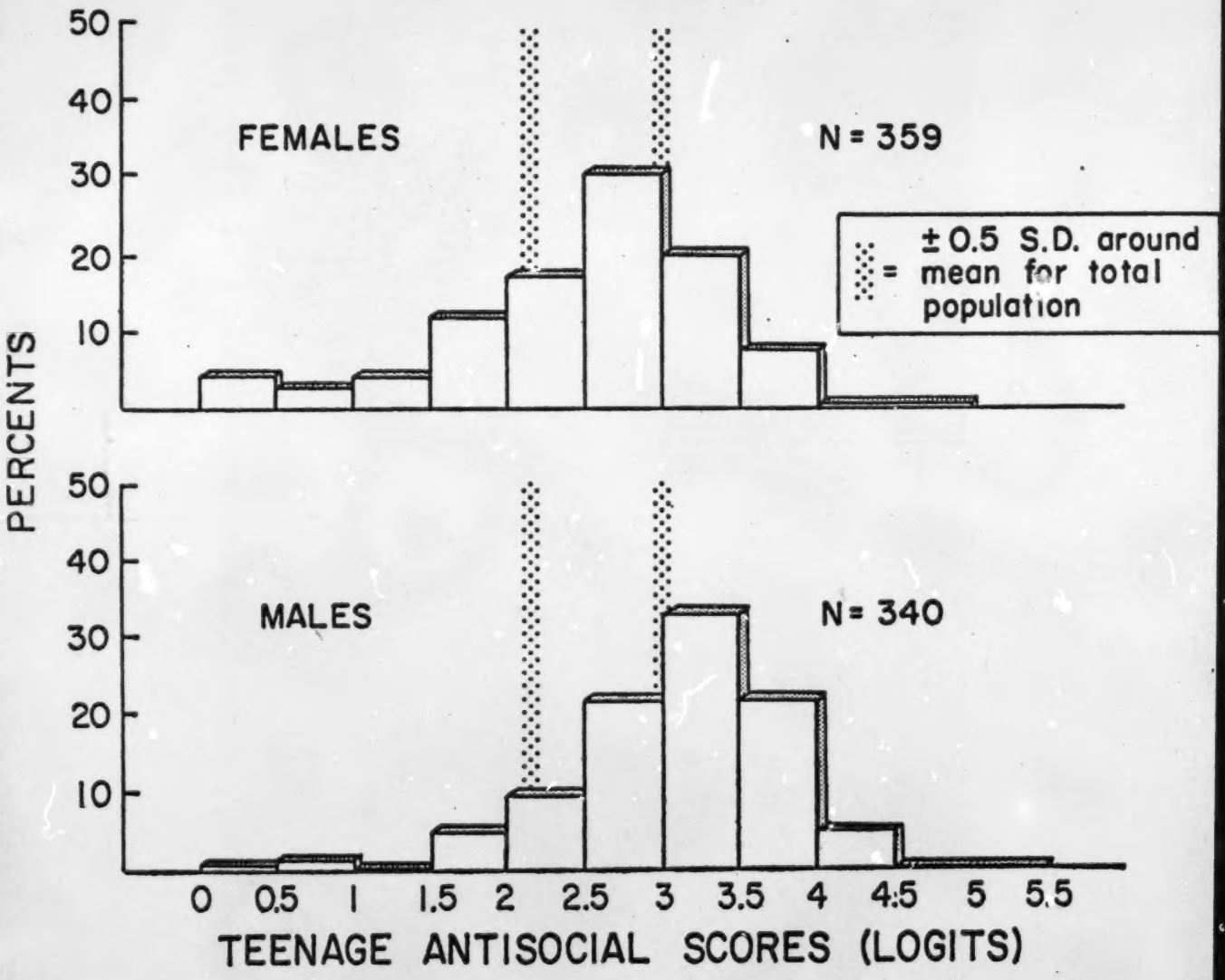
The size of the difference between the sexes, however, precluded our using the same cutpoints for males and females. When we calculated cutpoints for a trichotomy using the mean and standard deviation from the whole sample, the high category contained only 18 percent of the females but 47 percent of the males. Since increasing the number of categories made the tables too sparse, we decided instead to use different cutpoints for the sexes. The reader should bear in mind, when examining the data presented here, that the categories for males and females do not represent the same segments of the delinquency scale.

First Grade Teacher Ratings and Teenage Delinquency

Measures of classroom SAS for the first-grade children of Woodlawn were obtained by asking the natural raters in this social field--teachers--what social tasks were expected of children. We formed scales based on the teachers'

FIGURE 1

ANTISOCIAL BEHAVIOR BY TEENAGE MALES AND FEMALES



answers and then asked the teachers in standardized fashion to rate the children in their classroom on each scale.

The primary instrument used to measure SAS in the classroom is thus the Teacher's Observation of Classroom Adaptation (TOCA), which contains five rating scales measuring different social tasks the child was expected to perform: social contact (shyness--i.e., sitting alone, not speaking up much, having few friends): authority acceptance (aggressive behavior--i.e. fighting and breaking rules): maturation (not clinging): cognitive achievement (learning up to ability as the teacher sees it): and concentration (paying attention). In addition, a global scale was included of how well the child was doing overall in becoming a student. During a standardized interview, each teacher rated the students on each social task according to a four-point scale running from adaptive behavior to severely maladaptive behavior. Teachers made TOCA ratings early in the 1966-67 school year, at midyear, at its end, and again in third grade. Reliability and validity data for these SAS scales are reported in Kellam et al. (1975).

In these analyses we use only end-of-year TOCA ratings. In the analyses to follow, the TOCA scales are treated as categories and collapsed to produce three maladaptive patterns of responding, each with three levels (not at all, mild, and moderate or severe). The three patterns are: shyness; aggressiveness; and learning problems, where the score consisted of the most severe rating given by the

teacher in either cognitive achievement (does the child learn up to ability as the teacher perceives it), maturation (acting with sufficient independence to accomplish first-grade tasks), or concentration (paying attention for a sufficient span of time to allow for teaching and learning). This approach to learning problems is similar to Kohn and Rosman's (1972) concept of task orientation and to a learning problems category developed by Lambert and Nicoll (1977).

We first analyzed the effects of first grade teacher ratings of shyness, aggressiveness, and learning problems on delinquency. Table 2 shows the likelihood ratio chi-square goodness of fit statistics for the independence model and the best fitting model (if different) for males and females. A small chi-square statistic (or a large p-value) means that the model fits the data well. The chi-square statistics for the effects test the hypotheses that the listed effects are null. A large chi-square statistic (or a small p-value) means that it is improbable that the effects are null. We chose best-fitting models using a forward selection method, which also dictated the way the statistics for the effects were calculated. (Goodman 1971.)

Table 2 goes about here

The models presented in Table 2 show clearly that first grade aggressiveness and shyness predict delinquency ten

Table 2

Summary of Results of Log-Linear Analyses of the Effects of First Grade Teacher Ratings of Shyness (S), Aggressiveness (A), and Learning Problems (L) on Teenage Delinquency (D)

	Males (N=338)				Females (N=357)			
	Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best-Fitting Model	χ^2	df	p
Models	(D) (SLA)	72.63	49	.016	(D) (SLA)	47.36	43	.299
	(AD) (SD) (SLA)	45.20	41	.301				
Effects	AD	13.58	4	.009				
	SD	13.85	4	.008				

Note: The degrees of freedom are reduced by the presence of fitted zeroes.

years later for males, but not for females. Learning problems alone do not predict delinquency for either sex. Figure 2 illustrates what these relationships consist of. Each of the four panels contains a histogram showing the distribution of the Rasch delinquency score for a given population. The four populations are those at the moderate or severe levels of the first grade measure, whose behavior brings out the effect most clearly. From the bottom up they are: those rated as neither shy nor aggressive; those rated as moderately or severely shy and moderately or severely aggressive; those rated as moderately or severely aggressive but not shy; and those rated as moderately or severly shy but not aggressive.

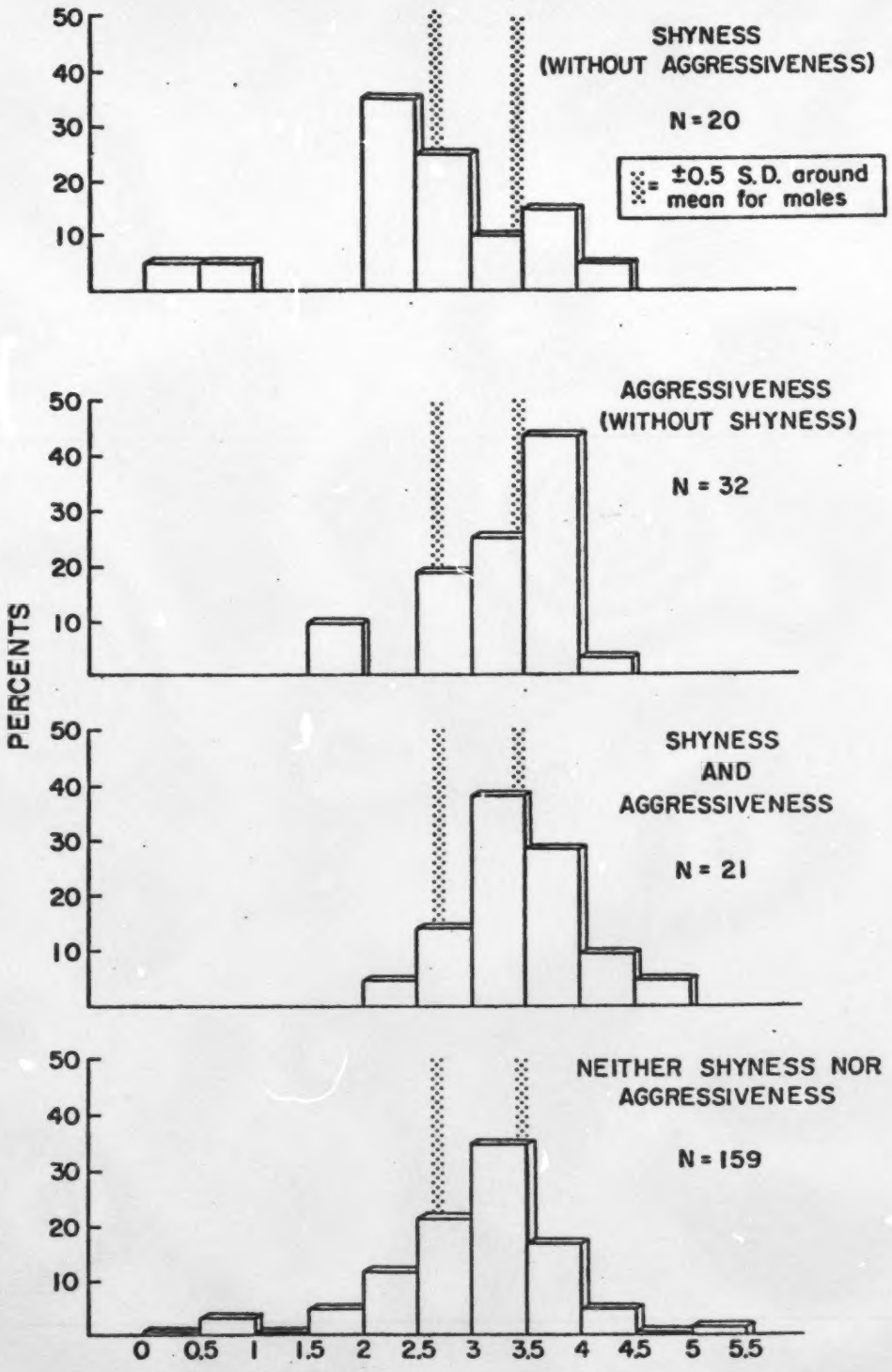
Figure 2 goes about here

It is clear from these diagrams that, as compared with the base category, first-grade shyness without aggression inhibits delinquency ten years later, while first-grade aggression without shyness promotes delinquency ten years later. Forty five percent of the first-grade shy non-aggressive males were in the lowest of the three delinquency categories ten years later, as compared to 9 percent of the aggressive non-shy males and 21 percent of those neither shy nor aggressive. It is important to recognize that these are two separate effects: shyness and aggressiveness are not simply the opposite ends of a single scale.

The log-linear analysis does not show a statistically significant interaction between the effects on delinquency of shyness and aggressiveness. Nevertheless, certain characteristics of our data together with our previous research on shyness and aggressiveness persuade us that such an interaction may well exist. Since there were only 21 males in our sample who were rated moderately or severely shy and aggressive, only a very large effect would be likely to create a finding in our sample that would be statistically significant at the .05 level. If the effects of shyness and aggressiveness were additive we would expect the moderate or severe shy/aggressives to be less delinquent than the aggressive subjects and more delinquent than the shy subjects. In fact, they are even more delinquent in our sample than the aggressives: 38 percent of them are in the highest delinquency category, 13 percent more than the aggressives. Since this 13 percent in fact represents only about three people, we cannot conclude with much confidence that shyness in the presence of aggressiveness increases rather than reduces the risk of delinquency; but we feel confident in asserting that shyness in first grade inhibits delinquency ten years later only when it is present without aggressiveness. In the presence of aggressiveness it loses its inhibiting power. Our previous research on substance use also found that the combination of moderate or severe shyness with moderate or severe aggressiveness in first grade led to the highest risk of maladaptation ten years later.

FIGURE 2

SHYNESS AND AGGRESSIVENESS (MODERATE AND SEVERE) IN FIRST GRADE AND TEENAGE ANTISOCIAL BEHAVIOR BY MALES



First Grade Cognitive Tests and Teenage Delinquency

Next we examined the effects of the two test measures of cognitive achievement in first grade, Metropolitan Readiness Test (MRT) and IQ. We use child's performance on the MRT scores for the first-graders and IQ and as quasi-SAS measures. The schools use these indicators in assessing the child's performance, and they represent the child's success at the cognitive tasks in the classroom. The MRT and Kuhlmann-Anderson Mental Maturity Test were administered to the students early in first grade by the teachers or staff in the Chicago public schools, but not in the Catholic schools. These variables had 4 and 3 levels respectively. Since these variables may be related to the teachers' ratings, we analyzed each in a log-linear model together with shyness and aggressiveness, as well as delinquency. Table 3 displays the results.

Table 3 goes about here

These models comfirm that aggressiveness and shyness predict delinquency only for males. Cognitive test performance in first grade, however, appears to predict delinquency only for females. We wanted to test whether these two effects were independent by estimating a joint model including both IQ and MRT. This proved to be impossible, since 41 out of the 53 girls who scored "immature" (the lowest score) on the MRT did not have IQ

scores. Since, as noted below, most of the effect of both of these tests was in the difference of the lowest category from the others, the inclusion of IQ made it difficult to estimate an MRT effect. In fact, the log-linear model with both IQ and MRT showed only a significant IQ effect, but in view of the problems of missing data, we cannot regard this as conclusive.[2]

Figures 3 and 4 show the distribution of delinquency scores among females within categories of MRT and IQ. Table 4 presents the distributions of the delinquency trichotomy used in the log-linear analyses for the categories of these two variables. Most of the effect of MRT is due to the immature girls having lower scores than the other three categories; 41.5 percent of these subjects had "low" delinquency scores, as apposed to about 20 percent for each of the other categories.

Figures 3 & 4 and Table 4 go about here

The results for the IQ scores as shown in Figure 4 and Table 4, are quite similar. Again, the lowest category has lower delinquency than the others. Low cognitive test performance in first grade girls appears to predict less delinquency ten years later.

Family Characteristics and Teenage Delinquency

Family structure is measured in the mother interview in first grade and at the time of the follow-up in terms of the

Table 3

Summary of Results of Log-Linear Analyses of the Effects of Metropolitan Readiness Test (M), IQ (I), Aggressiveness (A), and Shyness (S) in First Grade on Teenage Delinquency

	Males				Females			
	Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best-Fitting Model	χ^2	df	p
MRT (N=303)					MRT (N=319)			
Models	(D) (MAS)	95.34	68	.016	(D) (MAS)	82.51	66	.082
	(AD)(SD)(MAS)	73.47	60	.114	(MD) (MAS)	69.77	60	.182
Effects	SD	12.37	4	.015	MD	12.74	6	.047
	AD	9.50	4	.050				
IQ (N=253)					IQ (N=282)			
Models	(D) (IAS)	68.05	51	.055	(D) (IAS)	68.13	50	.045
	(AD)(SD)(IAS)	48.33	43	.266	(ID) (IAS)	57.67	46	.116
Effects	SD	11.68	4	.020	ID	10.46	4	.033
	AD	8.04	4	.090				

Note: The degrees of freedom are reduced by the presence of fitted zeroes.

FIGURE 3

FIRST GRADE READINESS TEST SCORES AND TEENAGE ANTISOCIAL BEHAVIOR BY FEMALES

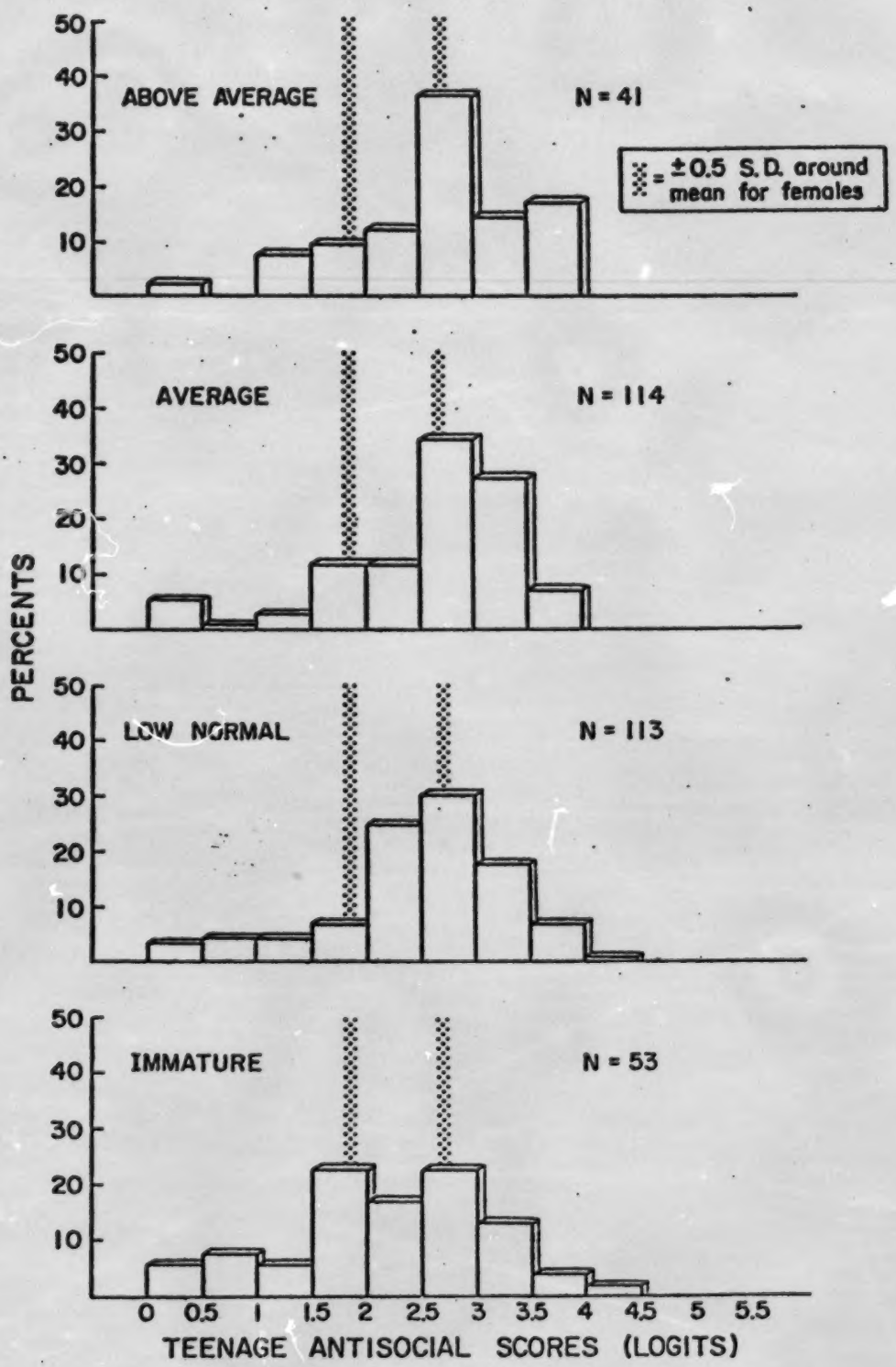


FIGURE 4

FIRST GRADE IQ SCORES AND TEENAGE ANTISOCIAL BEHAVIOR BY FEMALES

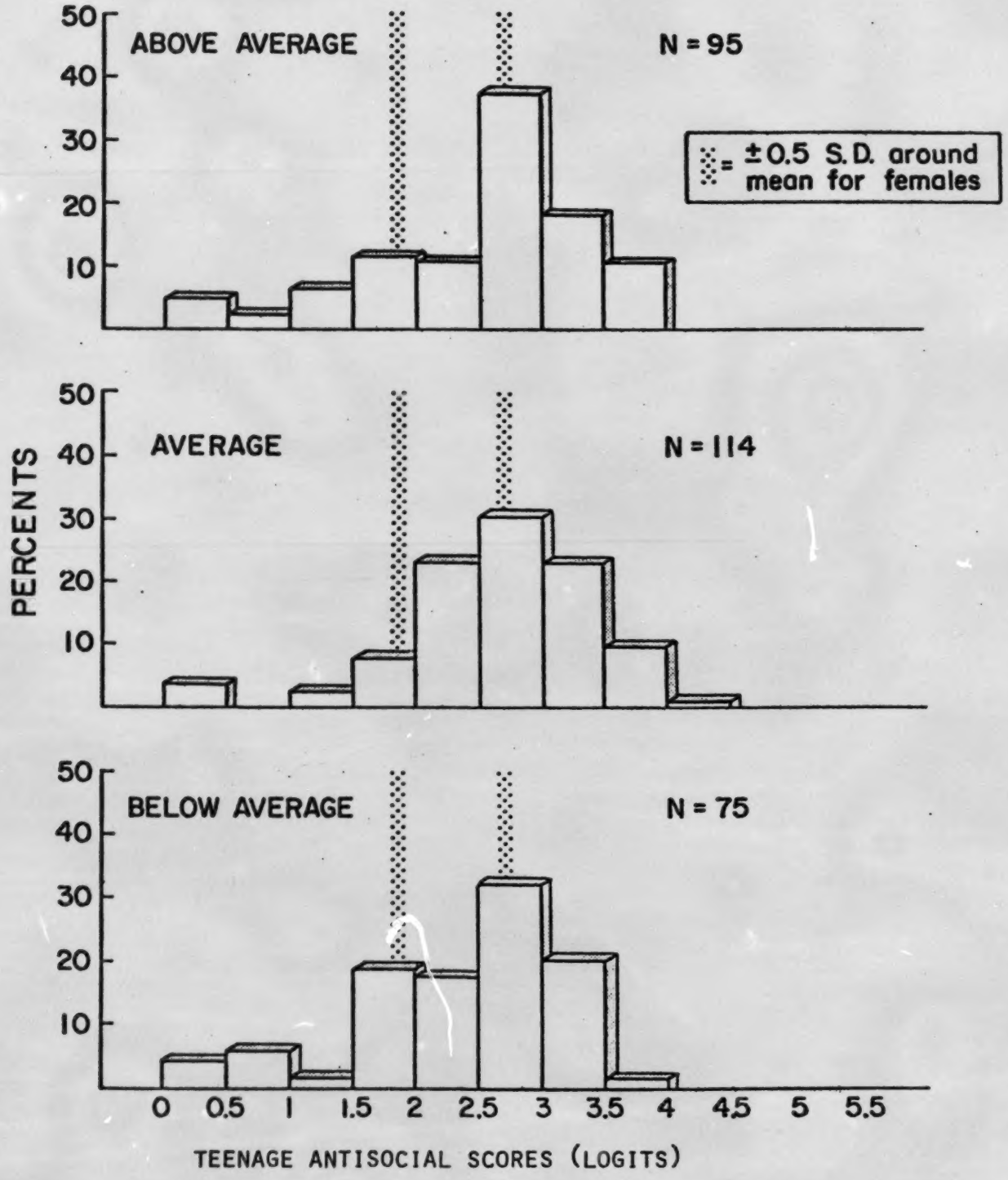


Table 4

Distributions of Delinquency Scores in Different Categories of First-Grade Readiness Test (MRT) and IQ Scores Among Females

	Delinquency Score (percent)			
MRT Scores	Low	Middle	High	N
Immature	41.5	39.6	18.9	53
Low Normal	19.5	50.4	30.1	113
Average	20.2	43.0	36.8	114
Above Average	19.5	48.8	31.7	41
IQ Scores				
Below Average	29.3	49.3	21.3	75
Average	14.0	47.4	38.6	114
Above Average	24.2	45.3	30.5	95

adults present in the child's home. In the first interview there were 86 different combinations of adults present in the child-rearing families; these were classified first into ten categories, then into six for analytic purposes --mother alone; mother/father families with or without other adults; mother/grandmother or /aunt families; mother/stepfather families; mother/other adults (most often a sibling over 18 years); and mother absent families. In our analyses of the effects of family structure and atmosphere, we analyze the effects of these variables at time 1 and 2 together, in order to study whether change or stability of the family have effects on teenage outcome.

For the analyses here we used two simplified classifications. One classified the family into six categories: mother alone, mother and father, mother and grandmother or aunt, mother and stepfather, mother and other (usually an older sibling), and mother absent. The second classification took advantage of our previous research on family composition and adaptation in the first-grade classroom to place most families in either a high risk or a low risk category. (Because mother/stepfather families appeared to have opposite effects in two cohorts studied previously, we omitted them from this dichotomy.) The low risk category included both mother/father and mother/grandmother or /aunt families, while the high risk group included mother alone, mother absent, and mother/other families. We used only the dichotomy in our log-linear models.

First we analyzed the effects of family composition in first grade and ten years later on delinquency ten years later. As Table 5 shows, there is weak evidence of an effect of family composition at the time of first grade on delinquency ten years later for males, and no evidence for females. (Normally the level of significance of the effect reported in Table 5 would lead to the acceptance of the null hypothesis, but, in view of the findings reported below, we decided to report it.) Family type ten years later at the time of the teenagers' reports of delinquency was not related to delinquency for males or females. This implies that the effect of early family composition for males is set by first grade. Change or stability of the family type afterwards has no additional effect on teenage delinquency.

Table 5 goes about here

Since we know that first grade family composition was related to the teacher ratings, we performed a joint analysis of the effects of aggressiveness, shyness, and family type in first grade on delinquency ten years later. As Table 6 shows, this analysis revealed an interaction of the effects of first-grade family composition and first-grade aggressiveness. The histograms in Figure 5 and the "tree" diagram in Figure 6 illustrate what this interaction consisted of.

TABLE 5

Summary of Results of Log-Linear Analyses of Effects of Family Composition in First Grade (F_1) and Ten Years Later (F_2) on Teenage Delinquency (D)

Males (N = 305)				Females (N = 328)			
Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best Fitting Model	χ^2	df	p
Models (D) (F_1 F_2)	8.32	6	.215	(D) (F_1F_2)	9.07	6	.170
(F_1D) (F_1 F_2)	3.53	4	.472				
Effects F_1D	4.79	2	.091				

Figures 5 & 6 and Table 6 go about here

The relation among the three variables for males can be summarized in three points. First, the low-risk families produce fewer children who are aggressive by the end of first grade, although the difference is not quite significant at the .05 level (X^2=5.44, df=2, p=.066); second, children from low-risk families who did not become aggressive by first grade have a reduced risk of delinquency ten years later; and, third, those children from low-risk families who became aggressive by first grade do not differ in delinquency ten years later from those children from high risk families in first grade.

Since performance on first grade readiness and IQ tests rather than teacher ratings of shyness and aggressiveness predicted teenage delinquency for females, and since MRT and IQ scores might also be related to family type, we also examined the joint effects of family composition, first grade test scores, and delinquency. Table 7 reports these analyses. As before, we found no relationship between first-grade MRT and IQ test scores and teenage delinquency for males. For females, however, IQ and MRT are still significant predictors; furthermore, although first grade family type alone does not predict teenage delinquency among females, it does appear to modify the effect of IQ.

Table 7 goes about here

The log-linear parameters for the interaction of the effects of first-grade IQ and family type on delinquency show the interaction clearly. The only statistically significant parameters were those for the lowest IQ level. Family type in first grade does affect delinquency for the girls with the lowest I.Q. scores (X^2=6.72, df=2, p=.03). Girls with low IQ's from low-risk families have considerably less delinquency ten years later than any other group.

Although the total interaction of the effects of MRT and family type on delinquency is not significant for females, the same effect exists there. One of the log-linear parameters of the interaction in the lowest MRT category is statistically significant, and family type does have a significant effect on delinquency within the lowest category of MRT (X^2=6.37, df=2, p=.041). Again, the girls with low cognitive performance from low-risk families have significantly less delinquency ten years later. Family type has no effect within the other categories of MRT.

We next examined mother's expectations as to how far her child would go in schooling. In both interviews mothers were asked about how far they actually thought their child would go in school. Their assessments were measured on a 5-point scale from "some high school" to "beyond college". In this paper, we dichotomized these responses: 'high

FIGURE 5

FAMILY TYPE AND AGGRESSIVENESS IN FIRST GRADE AND TEENAGE ANTISOCIAL BEHAVIOR BY MALES

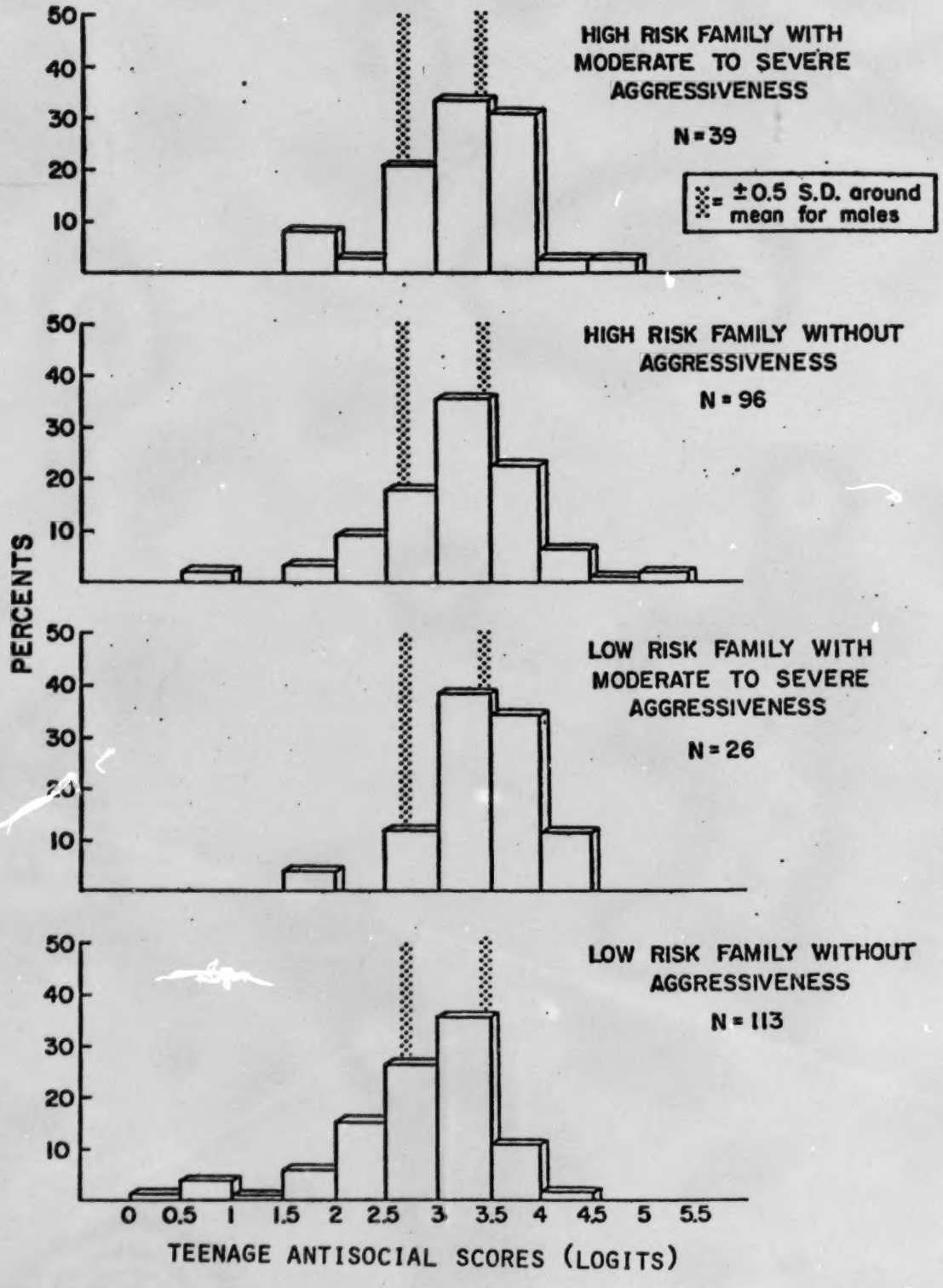


FIGURE 6

FAMILY TYPE AND AGGRESSIVENESS IN FIRST GRADE AND DELINQUENCY TEN YEARS LATER AMONG MALES

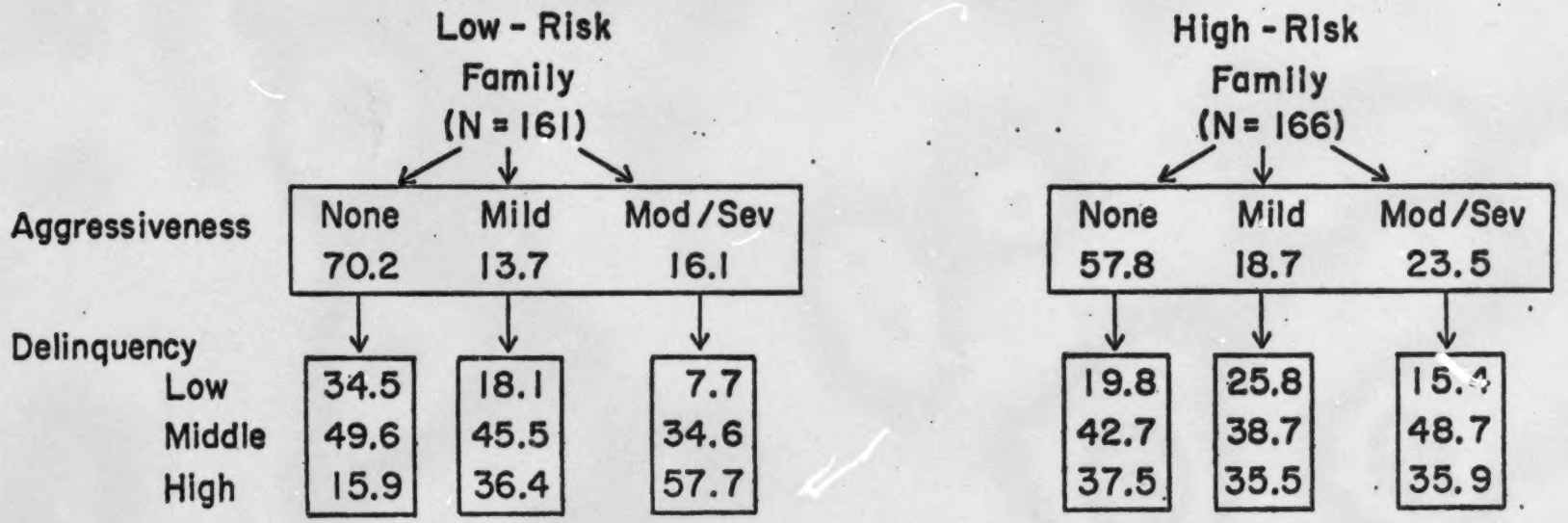


TABLE 6

Summary of Log-Linear Analyses of the Relationships Between First-Grade Aggressiveness (A), Shyness (S), and Family Composition (F_1) and Teenage Delinquency (D)

Males (N = 327)					Females (N = 347)			
	Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best-Fitting Model	χ^2	df	p
Models	(D) (ASF_1)	59.55	34	.005	(D) (ASF_1)	38.01	34	.291
	(SD) (AF_1D) (ASF_1)	17.69	20	.608				
Effects	AD	11.72	4	.020				
	SD	11.64	4	.020				
	AF_1D Interaction	18.30	6	.006				

TABLE 7

Summary of Log-Linear Analyses of the Relationships Between First Grade Readiness Test Scores (M), IQ Scores (I), and Family Composition (F_1) and Teenage Delinquency (D)

	Males				Females			
	Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best-Fitting Model	χ^2	df	p
MRT (N = 297)					MRT (N = 311)			
Models	(D) (MF_1)	13.19	14	.512	(D) (MF_1)	24.84	14	.036
					(MD) (MF_1)	12.19	8	.143
Effects					MD	12.65	6	.049
IQ (N = 247)								
Models	(D) (IF_1)	12.01	10	.284	(D) (IF_1)	21.23	10	.019
					(DIF_1)	0	0	-
Effects					ID	9.69	4	.046
					F_1D	2.21	2	.331
					IF_1D Interaction	9.33	4	.053

school graduation or less' and 'at least some college.' We analyzed the effects of both early and later expectations together, as reported in Table 8. Early expectations do not have an effect for either sex, nor does it appear to matter whether these expectations change for the better or worse or stay the same. Concurrent expectations are indeed negatively related to delinquency, but the causality probably runs in the opposite direction; mothers realize that their delinquent children are not likely to continue their education very long.

Table 8 goes about here

Another aspect of family atmosphere important for child outcomes is the psychological well-being of the mother. At both time 1 and time 2 the mothers were asked questions designed to measure "sadness" and "tension". The interviewers asked them, "How often do you have days when you are sad and blue?" and "How often do you have days when you are nervous, tense, on edge?" The possible answers were "hardly ever," "occasionally," "fairly often," and "often." At time 2 we also asked the mothers fifteen items forming four a priori constructs for anxiety, depression, bizarreness, and self-esteem, each measured on a 6 point scale. Brown, Adams, and Kellam (1981) used these items to test the validity of the simpler sadness and tension items and found that the latter were indeed valid measures. For

the analyses reported here, these items are dichotomized in two ways, contrasting with the highest or the two highest of four categories with the lower categories. We also used a global measure of "sadness or tenseness" that contrasted those mothers who were in the upper two categories of either item with the others. These analyses include only the biological mothers of the subjects. In the future we will extend the analysis to mother surrogates and non-biological mothers as well.

Table 9 presents the results of the log-linear analyses. No measure of mothers' psychological well-being at time 1 or time 2 is related to sons' delinquency at time 2. This means that neither mother's distress early or later in life nor change or stability in the degree of distress affects the likelihood that a son will become delinquent. Furthermore, a son's teenage delinquency does not cause psychological distress in the mother.

Table 9 about here

For females, the situation is quite different. Mothers' sadness or depression has a continuing influence on the likelihood that daughters will become delinquent. Analyses using different cutpoints to dichotomize the "sadness" responses showed that it is only, or predominantly, the most extreme form of sadness that has this effect. The daughters of sad mothers are more likely

TABLE 8

Summary of Log-Linear Analayses of the Relationships Between Mother's Expectations in First Grade (E_1) and Mother's Expectations Ten Years Later (E_2), and Teenage Delinquency (D)

	Males (N = 322)				Females (N =342)			
	Independence Model and Best-Fitting Model	χ^2	df	p	Independence Model and Best-Fitting Model	χ^2	df	p
Models	(D) (E_1E_2)	16.76	6	.010	(D) (E_1E_2)	9.73	6	.136
	(E_2D) (E_1E_2)	4.69	4	.320	(E_2D) (E_1E_2)	3.63	4	.459
Effects	E_2D	12.07	2	.002	E_2D	6.10	2	.047

Table 9

Summary of Log-Linear Models of the Effects of Mother's Psychological Well-Being in First Grade (P_1) and Ten Years Later (P_2) on Delinquency Ten Years Later (D)

	Males					Females			
	Independence Model and Best-Fitting Model	χ^2	df	p		Independence Model and Best-Fitting Model	χ^2	df	p
Sadness	(N=316)					(N=330)			
Models	$(D)(P_1P_2)$	7.56	6	.271	Models	$(D)(P_1P_2)$	18.03	6	.006
						$(P_1D)(P_2D)(P_1P_2)$	4.12	2	.127
					Effects	P_1D	7.02	2	.030
						P_2D	6.89	2	.032
Tension	(N=318)					(N=334)			
Models	$(D)(P_1P_2)$	4.42	6	.620	Models	$(D)(P_1P_2)$	7.57	6	.271
						$(P_2D)(P_1P_2)$	.66	4	.956
					Effects	P_2D	6.91	2	.032
Global	(N=317)					(N=332)			
Models	$(D)(P_1P_2)$	6.57	6	.362	Models	$(D)(P_1P_2)$	8.72	6	.190
						$(P_2D)(P_1P_2)$	1.51	4	.825
					Effects	P_2D	6.21	2	.045

Note: Sadness contrasts the highest category with the lowest three. Tension and Global contrast the upper two categories with the lower two.

than other girls to become delinquent. Since sadness has a continuing influence, it appears that improvement over time in the mother's well-being will reduce the risk of delinquency in the daughter and that deterioration of the mother's well-being will have the opposite effect.

Besides the direct effects of sadness at time 1 and time 2, we also believe that there is an interaction, although the interaction was not statistically significant at the .05 level in our data; Examination of the residuals from the model fitted with the direct effects of both time 1 and time 2 sadness shows a clear and reasonable pattern. Those daughters whose mothers were sad "very often" at both interviews had higher delinquency scores than would be predicted simply by combining the effects of time 1 and time 2 sadness. It appears that continual exposure to a depressed mother has an effect greater than the sum of the effects of periodic exposures.

Mothers' feelings of tension and global feelings of distress at time 2 (but not at time 1) are both associated with daughters' delinquency. This probably indicates that a delinquent daughter creates tension for the mother. It is interesting to note that this is not the case for delinquent sons. This negative reaction to delinquency in daughters, but not in sons, may explain why early aggressiveness does not predict later aggressiveness for daughters, as it does for sons.

We also examined other social structural variables in first grade to see if they predicted delinquency ten years later. The mothers were asked to report their yearly family income in both interviews. We have trichotomized the income categories into low, middle and high. Neither family income at time 1 or time 2, had any direct effect on delinquency ten years later.

Summary of Results

1. Males report antisocial behavior more frequently than females; self-reported delinquency in this population is considerable higher in comparison to other populations in which self-reports of delinquency have been assessed.

2. First-grade teachers' ratings of SAS are related to delinquent behavior for males. Males who were shy in first grade report less delinquency as teenagers. Both aggressive and shy-aggressive males report more delinquency. Males who were adapting or had only learning problems were in the middle. While the same patterns appear for females, the differences are not statistically significant. These findings are very similar to ones relating to substance use in this same population.

3. For females, first-grade cognitive test performance was related to later self-reports of delinquency. Those females who scored in the lowest category on either the

MRT or the IQ tests also reported the lowest delinquency ten years later.

4. Family structure in first grade, but not 10 years later seemed to operate for both males and females, to increase or decrease the risk of the variables cited above. Males who were aggressive in first grade had an increased risk of delinquency ten years later, regardless of family type. However, males who were not aggressive in first grade and who were in a high risk family type were as likely to be delinquent as the aggressive males, whereas nonaggressive males in a mother/father or mother/grandmother family had less delinquency ten years later. For females, poor performance on the first grade IQ or MRT tests was associated with less delinquency only for those girls in mother/father or mother/grandmother /aunt families.

5. Mothers' expectations in first grade for their children's future education were not related to the children's later delinquency; expectations at time 2 were related for both males and females, probably reflecting rather than influencing the teenagers' level of delinquency.

6a. Mothers' self-ratings of their psychological well-being are related to their daughters' delinquency, but not their sons'. The females with the highest delinquency are those whose mothers' reported very often having days

when they were sad and blue at time 1 and time 2. The least delinquent daughters were those whose mothers did not report this extreme measure of being sad and blue at either time 1 or 2. Daughters whose mothers were very often sad or blue at either time 1 or time 2 were in the middle.

6b. Mothers' psychological well-being had no relationship to their sons' delinquency.

7. Family income at either time 1 or time 2 was not related to delinquency.

Discussion

The Woodlawn analyses reveal antecedents of delinquency as early in the child's life cycle as first grade. These antecedents lie in the social structure and atmosphere of the family and in the specific quality of the child's social adaptation to school. It is likely that we will be able to find new antecedents and better specify the operation of those we have already found in the areas of adaptation to school, family structure and atmosphere, and psychological well-being. Such work is essential to developing programs of prevention.

Woodlawn is an urban, poor, black, and overcrowded community; and as an example of community epidemiology this project holds constant the macroscopic characteristics and focuses on the distribution of delinquency and other outcomes in relationship to variation in the social

structure, social adaptation, and psychological characteristics of the population. Age-specific, community-specific studies are necessary complements of broader studies of social and psychological function, such as those on national probability samples. Because community studies focus on defined populations, they may reveal rates of drug use, for example, to be higher or lower than rates in other communities or in less specific samples. Rutter (1970) also noted the necessity of community studies, saying that one cannot base national-scale planning on nationwide statistics, which do not reflect the differing needs of different areas. Mental health and illness, as well as drug use, have been shown to vary considerably from one community to another, and therefore warrant attention from studies within specific kinds of communities. Indeed, the relationships between social, psychological, and biological variables and later drug use and psychological well-being may vary from one kind of community to another.

The study of sex differences provides a strong tool for understanding the etiology of delinquency. In the Woodlawn data, psychometric analyses of the self-reports of delinquency lead us to conclude that males and females used the scale in a similar way -- that is, there seemed to be one major underlying dimension for both sexes. However, in the Woodlawn population, as in almost any population in which sex differences have been studied, the distribution of males and females differed so much that we could not use in

analyses the same categorization of low, middle and high delinquency. Equally important, our findings suggest that the paths that lead to delinquency are quite different for males and females.

Aggressiveness and shyness in first grade were important predictors of later delinquency, but only for males. These results are very similar to our earlier analyses of drug, alcohol, and cigarette use in which first-grade teacher-rated aggressiveness enhanced later substance use and shyness inhibited use -- again only for males. The absence of such results for females suggests major differences in the socialization and/or development of males and females.

Learning problems at end of first grade did not predict delinquency for either males or females. On the contrary, for delinquency as well as for use of drugs, alcohol, and cigarettes, learning problems revealed no antecedent relationship. Analyses of the teenage outcome of psychological distress, however, revealed first grade learning problems to be an important antecedent (Kellam et al. in press).

Among Woodlawn males, family structure interacted with aggressiveness. First, in those families with another adult in addition to mother -- either father, grandmother, or aunt -- there were fewer aggressive boys. In these low-risk families, the nonaggressive males had less risk for later delinquency. The low risk families seemed able to inhibit

the development of antisocial behavior by these nonaggressive males. Second, in the high-risk families, where either no second adult was present or one less blood-related, aggressive first grade males were more frequent; but nonaggressive boys were as likely to be delinquent ten years later as were early aggressive males.

Family structure at first grade was important, while family structure at age 16 or 17 was not. This suggests that the benefits of the low risk family structure are more than stronger adolescent supervision or external control. Also, the fact that aggressive first grade males from low-risk families are as likely to be delinquent later as those from high-risk families suggests that there is something inherent in early aggressive males that is not easily amenable to family control. It may be, however, that certain low-risk families enhance the early and continuing aggressiveness of their sons.

Studies by Bandura (1965) suggest that training may be important in the sex differences on aggression. He found that while males were found to be more aggressive than females in the experimental setting, after children were offered attractive reinforcements for aggressive behavior, the disparity in aggressiveness between girls and boys almost disappeared. These results suggest that the sex difference in real life is vulnerable to reinforcement of male and female behavior, and is not a fixed characteristic.

The importance of early aggressiveness in males as a predictor of later antisocial behavior has been underlined in several studies; however, the impact of early shyness as an inhibitor of later antisocial behavior has been much less investigated and understood. The Woodlawn data suggests that first grade shyness and being a female are both associated with less substance use and less delinquency later on in mid-adolescence. These two may be related biologically, socially, or psychologically and this area presents important avenues for further research.

Early learning problems and early cognitive test performance did not relate to later delinquency for Woodlawn males. The relationship between school failure in adolescence and delinquency is frequently reported in the literature. It may be that the relationship between school failure and delinquency found in other studies derives from the strong association between learning problems and aggression. The longitudinal nature of the Woodlawn data and the separation of learning problems from aggression in first grade made it possible for us to examine their independent or combined contribution to delinquency. The results reported here are the same as those we found for antecedents of substance use, thus lending further reassurance to this inference (Kellam et al. In press). In our results shyness, often accompanied by learning problems, inhibits later delinquency, aggressiveness, also often accompanied by learning problems, enhances later

delinquency, and learning problems alone are not related to later delinquency.

For females, cognitive test performance is related to later delinquency, but in the opposite direction to that suggested by the literature. Girls who performed in the lowest categories on the cognitive tests reported the least delinquency later. However, family structure was also involved here. Only those low scoring females from the mother/father, mother/grandmother or mother/aunt families showed this reduced risk. Earlier Woodlawn findings show that females in the "immature" category on MRT formed stronger family bonds and weaker peer bonds as teenagers than the other females (Ensminger, Brown, and Kellam, in press). Early poorly performing females may either have difficulty becoming independent of their families (explaining both their low performance and delinquency) or retreat to their families as an alternative source to the school for social support. However, this response appears only to occur in low risk families, i.e. those whose strength and warmth may be a haven from the stressful demands of school.

The relationship of mothers' psychological well-being to females' later delinquency also suggests the importance of family in the development of delinquency for girls. The fact that both the changing and stable self-ratings of the mothers psychological well-being were important for the females delinquency indicates the developmental significance of this aspect of family.

Our findings indicate the importance of examining the interplay of family and school on the later advent of delinquent behavior. While family structure has only a slight direct relationship to delinquency for males and no such relationship for females, the early family structure of Woodlawn children increases or decreases their vulnerability to conditions that lead to later delinquency.

Footnotes

1. Those respondents who claimed never to have performed any of the 21 acts mentioned in the items could not be scored directly on the Rasch scale. We assigned them scores by extrapolating the lower end of the scale. We also used the Rasch calibration of the items to assign scores to all respondents answering at least 19 of the 21 items. Only 6 of the 705 respondents failed to do so.

2. We do not know if the immature girls were unable to complete the IQ test, were far more likely to be absent when it was given, or scored so low that the schools preferred not to report their scores. It is also interesting to note that 47 percent of the girls rated as moderately or severely shy (15 out of 32) did not have IQ scores, as opposed to 17 percent of the non-shy and 25 percent of the mildly shy girls. Shyness is associated with low MRT scores.

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